

COST *and* MANAGEMENT

THE OFFICIAL JOURNAL OF

THE CANADIAN SOCIETY OF

COST ACCOUNTANTS & INDUSTRIAL ENGINEERS

INCORPORATED 1920

HEADQUARTERS, 600 MACKAY BUILDING,

66 KING STREET EAST, HAMILTON

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Vol. XV.

April, 1941

No. 4

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Subscription price to non-members, \$5 a year. Single copies 50 cents.
Members desiring 5 copies or more of a single issue may obtain them
at 25 cents each.

EDITORIAL

The Future of Cost Accounting

For some time a Select Committee on National Expenditure has been sitting in England. The Third and Fourth Reports of this Committee were recently issued and devote considerable space to forms of contract and particularly their effect on costs and it is quite startling to read that the Committee's statement that it has so far been unable to see the actual costs of almost any articles which have been delivered since the war began and so have been unable to determine whether or not the State is in effect paying too much for what it receives.

The report goes on to state that the present system, although valuable, provides statistics so late that it must be extremely difficult for the Production and Contracts Departments to exercise any real check on the efficiency of firms. One case was shown where a firm got out figures each month for its own benefit but these figures and reports are in such detail that the purpose of the reports were really defeated.

Some firms show costs much higher than others for the same articles although there are reasons given for this. There are many other matters discussed in these reports but for the moment these will suffice.

It is however interesting to note elsewhere in the report that the Committee clearly defines Cost Accounting as a Technical subject with which finding most people who know, will agree. The Cost Accountant, has both by his training and his experience, a real knowledge of the production side of his business or if he hasn't then he isn't a Cost Accountant.

However, dealing with the first part of the Committee's report it would seem that Cost Accountants in England are up to the old tricks which used to permeate cost systems in this country. They are, of course, up against great difficulties but it would seem that in many instances the old fault of producing voluminous reports far too late to be of any real value and in any event, non-understandable to non-accounting minds is again to the fore.

In this country Cost Accounting is by no means free from this fault but it is rapidly dying out and must be stamped out completely if there is to be any real future for Cost Accounting.

So far as War Contracts are concerned it is very doubtful indeed if there is any real trouble in this country so far as Cost Accountants are concerned. The Treasury Cost Section of the Department of Munitions and Supply, under the very able direction of Mr. F. E. Wood, has done and is doing a very splendid job. But, even they are under a real handicap and it would seem that the big difficulty, and we suppose that it applies even more so in England, is the very real shortage of good Cost Accountants with complete and diversified knowledge.

ACROSS THE SECRETARY'S DESK

Cost Accounting is a real profession; it involves not only good accounting knowledge but a thorough training in production methods, to some extent in wage incentives and requires a keen analytical mind. Above all it requires sound common sense. And it is not common sense for Cost Accountants to surround themselves with a halo and to produce reports which are not understood by the average executive nor to produce them too late for action.

Cost Accountants have it in their own hands to make a real future for the profession and we, in an organized Cost and Industrial Accountants' Society, can and must do much to make it certain that men are properly training for this profession which should have a real future.

More and more as time goes on and especially when the war ceases and real competition again comes to the fore good Cost Accountants will be more than ever in demand.

Across the Secretary's Desk

It is doubtful if ever in the history of our Society have chapter meetings been so well attended as was the case during the month of March. This is all the more gratifying when it is realized that most of our members are putting in lots of extra time at work and that, in many cases, year end work has only just been concluded.

The Toronto Chapter had its largest attendance in years when Mr. H. Wolfenden addressed the members on "Unemployment Insurance", Niagara had its largest attendance ever for a talk on this subject also. Kitchener had its second largest attendance to hear a talk on the "Excess Profits Tax Act", while Windsor, in a joint meeting with the Detroit Chapter, N.A.C.A., had ninety-six present for dinner, and London had one of its most successful meetings also in March. In Hamilton, the attendance kept up to its usual high mark, and in Ottawa the attendance continues to grow with every meeting.

The subjects for discussion at these meetings may have been in some cases most currently interesting but the fact remains that considering the extra work thrown on most of our members due to the war the attendances have been extremely good this season and it augurs well for our future.

In Montreal also, the attendances have been very good this season, and altogether it has been a most successful season.

The race for the Fernie Trophy continues to be close, with Kitchener, Niagara, Toronto and Montreal staging a great race. This trophy is awarded to the chapter showing the greatest percentage of increased membership during the year. Last year the trophy was won by the Hamilton Chapter but the Ambitious City boys will have to put on a great spurt if they are to retain possession of the trophy.

The Student Sections in the various centres continue their good work and here we are not only training future senior members but future senior executives.

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If you don't believe me, take a look at the Toronto Student Section. I dropped in at a meeting of this Section on April 9th, and was again struck not only by the keenness of the members, but also by the way they conduct their meetings.

I predict that one year from now these Student Sections will be one of our greatest assets.

Applications to write the Society's examinations continue to come into this office and, in view of our new "degree" powers in Ontario and Quebec, these examinations are now of real importance. Some members feel that they need a little refreshing before writing the exams and I have had many requests for exams in the fall. Such examinations may be held but those who feel they can write examinations this month would be well advised to do so.

Our Private Bills in both Ontario and Quebec have now finally passed and the long struggle for "degree" powers has now ended satisfactorily. We should endeavour at all times to be worthy of this trust and I believe we shall.

R. D.

Chapter Notes

Toronto Chapter.

One of the largest attendances in the history of the Toronto Chapter greeted Mr. H. Wolfenden, who addressed the members at the April meeting on the subject of "Unemployment Insurance". Not only was the attendance good, but the meeting also was one which will long be remembered. Mr. Wolfenden is an authority on this subject, which he handled in splendid fashion. Later came the discussion period which was indeed a real one and the members present went home in a very happy vein.

The closing dinner dance of the chapter will be held at the Old Mill on Wednesday, April 23rd, and, judging from the interest already displayed, it gives promise of being the best ever.

Hamilton Chapter.

The Hamilton Chapter held two very successful meetings during March. The first was addressed by Mr. C. B. Taylor, of Toronto, who spoke on "A New Tool for Management", and the second by Professor W. S. Ferguson, C.A., of Shaw Schools, Toronto. Mr. Ferguson spoke on "Wage Incentives and Wartime Finance". Both meetings were well attended and in both instances the discussion periods proved of real interest.

On April 15th, Mr. C. Warnes, of the Canadian Kodak Co. Ltd., Mount Dennis, will speak on "The Control of Maintenance and Repair Costs".

Niagara Chapter.

The March meeting of the chapter was undoubtedly the best of the season and just about the largest attendance ever for a chapter meeting. The speaker was Mr. Frank Landeg, of The Steel Company of Canada Ltd., Hamilton, and he spoke on "Unemployment Insurance". Fifty-six attended the dinner at the Leonard Hotel, St. Catharines, and about seventy-five were present for the meeting.

CHAPTER NOTES

Kitchener Chapter.

Mr. J. C. White, C.P.A., of the Income Tax Department, was the speaker at the March meeting of the chapter held at the Granite Club, Kitchener, and a real attendance greeted him. About fifty were present to hear a talk on "The Excess Profits Tax Act" and at the conclusion Mr. White was deluged with questions.

The April meeting of the chapter will be in the nature of a discussion meeting on April 17th, when Mr. A. J. Blanchard, of Toronto, will lead a discussion on "Standard Costs".

London Chapter.

The March discussion meeting of the chapter was one of the best of the year and certainly had the second largest attendance of the year. The chapter now holds dinner meetings with dinner at a minimum cost and these dinner discussion meetings seem to have rejuvenated the chapter. The next meeting, also a discussion meeting, will be held at the Y.M.C.A. on April 17th.

Windsor Chapter.

A joint meeting of the Windsor Chapter of the Canadian Society of Cost Accountants and Industrial Engineers and the Detroit Chapter of the National Association of Cost Accountants was held on Thursday, March 27th, at the Norton Palmer Hotel in Windsor. A total of about 95 members and guests were present, of whom approximately 60 were from Detroit. The speaker was Mr. R. W. Peden, Supervisor of Standards for the Bundy Tubing Co., Detroit.

Mr. Peden discussed "Cost Accounting in the Automatic Screw Industry: a Case Study Involving Machine Hour Rates; Standard Costs; and Pricing Technique." His remarks were based on experience in the installation of a cost system for a corporation in Michigan. He submitted several charts illustrating the use of machine hour rates composed of five factors: fixed burden element; an operating machine cost element; an element for wages; an element for indirect labor, and an element for labor burden. Mr. Peden illustrated the use of these rates for the control of operator performances, accounting, and calculating prices. The principal benefit derived by the company was the adjustment of prices and the elimination of unprofitable business.

Ottawa Chapter.

Ever since the chapter was first organized in December last, the attendance has increased with each meeting and the March meeting, held at the Laurentian Club on Friday, March 28th, was no exception. Thirty-six attended the dinner and about fifty greeted the Dominion President, D. R. Patton, C.A., of Montreal, when he addressed the chapter on the subject of "Variable Budgets". The address was both well delivered and well received and the number of questions asked at the close testified to the extreme interest in the subject under discussion. Dominion Secretary R. Dawson and Frank E. Wood moved a hearty vote of thanks at the close. For the April meeting, to be held on Friday, April 25th, the speaker will be Dr. J. S. Hodgson, Unemployment Insurance Commission, and the subject, "Unemployment Insurance". It is expected that once again the attendance will be a new record for the chapter.

Literature Received

The Use of Graphs in Controlling Production.

Cost Accountant, January-February.

A most enlightening article on the subject of Production Control and one which Cost Accountants generally would do well to study.

Costing of Government Contracts.

Cost Accountant, January-February.

Another article on this subject, of much interest to Cost Accountants in these days of war contracts.

Cost Concepts and Profit Control.

Federal Accountant, February.

A most interesting and illuminating article of real value to all Cost Accountants.

Manufacturing Overhead, Its Accumulation and Distribution. The N.Y. Certified Standard Costs—Construction and Application.

Public Accountant, March.

These two articles were read at a special technical meeting of the New York State Society of Certified Public Accountants in October last and together with a resume of the resultant discussions form a real study for Cost Accountants generally.

Variable Budgeting and the Control of Manufacturing Expenses.

Canadian Chartered Accountant, April.

A splendid article on a topic of much interest.

Cost Accounting in Commercial Banks.

N.A.C.A., March 15th.

A complete and interesting article showing to a surprising extent how Cost Accounting is being used in Commercial Banks.

Simplified Payroll Procedure and Labour Cost Distribution.

N.A.C.A., April 1st.

Direct Labour Variation Control.

N.A.C.A., April 1st.

Two very fine articles dealing with subjects of real interest to all Industrial and Cost Accountants.

An Introduction to the Study of Costing for Shoe Production. Part I.

The Accountant, February 22nd.

This is part one of a series of most interesting articles valuable especially to those engaged in this industry.

Student Section Notes

Toronto.

Mr. S. F. Saunders, C.A., was the speaker at the April 9th meeting of the Toronto Student Section and his subject, "Partnership Accounting", was both very well delivered and very well received. There was a good at-

NEW MEMBERS

tendance and the Dominion Secretary, who was present, spoke briefly on the subject of the Society's examinations.

The next and closing meeting of the Section will be on Wednesday, April 16.

Hamilton.

The Hamilton Section, having concluded its study of the set-up of a Modern Industrial Plant, held a meeting on March 25th, at which an Analysis was made of last year's Cost Accounting (First Year) examination questions. There was a good attendance and the members were keenly interested.

Niagara.

The early April meeting of the Niagara Section was also a big success. The whole evening was taken up with a study of previous examination questions on Costs.

Kitchener.

The Kitchener Student Section at its last meeting also considered previous Cost examination questions and again the attendance was well worth while.

London Section.

The London Student members are making a study of all phases of previous examination questions and part of each meeting is also being set aside for members' problems.

Windsor.

The Windsor Section is growing both in numbers and in enthusiasm and promises to be of real value to the members. On April 10th Mr. W. J. Person of the Canadian Motor Lamp Company spoke on the subject of "The Distribution of Factory Expense", and prior to the meeting the members held a Plant Visit to the plant of the Dominion Twist Drill Co. Ltd., at Walkerville.

New Members

Hamilton Chapter.

- G. Magnusson, Otis-Fensom Elevator Co. Ltd.
- M. Bard, National Steel Car Co. Ltd.
- A. E. Williams, Steel Co. of Canada Ltd.
- J. Campbell, Appleford Paper Products Ltd.

Niagara Chapter.

- E. D. Hallett, Thompson Products Ltd., St. Catharines.
- W. Plummer, Thompson Products Ltd., St. Catharines.

London Chapter.

- K. G. Queale, Jones Box & Label Co. Ltd.
- C. Stock, John Labatt Ltd.

Montreal Chapter.

- Gagnon Jacques, Canadian Vickers Ltd., Montreal.
- H. E. Madore, B.A., C.P.A., Montreal.
- Y. Joyal, Aluminum Co. of Canada Ltd., Montreal.
- Y. Dion, Aluminum Co. of Canada Ltd., Montreal.
- F. S. Fanjoy, Lamaque Mining Co., Bourlamaque, P.Q.

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- J. A. Vevina, Provincial Government, Quebec, P.Q.
H. A. Martin, Rimouski, Que.
J. Marmette, LeFaivre, Marmette & LeFaivre, Quebec, P.Q.
L. Charest, Quebec, P.Q.
J. W. St. Onge, L'Union St. Joseph de Drummondville, Drummondville, P.Q.
J. C. Chamberlain, Maple Leaf Milling Co. Ltd., Montreal.
G. Ouellette, Provincial Bank of Canada, Montreal.
J. P. Varmette, Montreal.
M. F. Crawford, Northern Electric Co. Ltd., Montreal.
W. E. Douglas, Consolidated Lithographing Co. Ltd., Montreal.
H. M. Barry, Benson & Hedges Ltd., Montreal.

Toronto Chapter.

- James Glenn, Line & Cable Accessories Ltd., Toronto.
J. E. McCallum, Canada Wire & Cable Co. Ltd., Leaseide.
A. W. Babcock, Cost Section, Department of Finance, Ottawa.
J. W. Oram, J. H. Crang & Co., Toronto.

Workmen and Company Profit With Wage Incentive Systems

Modern Profit-Sharing and Bonus Systems Increase Labor's Output, Thereby Raising Wages and Cutting Unit Manufacturing Costs

T. RUDD LODER

Cavalier Corp., Chattanooga, Tenn.

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The modern worker feels that he is entitled to a fair share of the profits which his employer is earning. He realizes that these profits must first be earned and his share in the creation of profit is through increased productivity.

Management's role is to provide the means by which this increased productivity is made possible; to do this, the employer must first be able to measure labor accurately and then work out a system which will reward the individual worker for his part in the creation of profit.

We think of "wages" as compensation for work or service. A wage incentive, then, is the reward received by the worker for extra effort. There are many wage incentive plans in use to-day. A wage plan that will work well under one set of conditions may not prove satisfactory in another situation, and often more than one plan is in operation in the same plant.

At first there may be opposition to an incentive plan. Management must be able to demonstrate that the standards set are fair, and that a premium can be earned by the worker in ratio to the work produced. The

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process of "selling" the worker on the idea may be an educational one; teaching the elimination of wasted energy in unnecessary movements, the correct placing and handling of stock, and in making and using jigs. It has been said that the objectives of an incentive system are:

To properly compensate the worker for his abilities; to produce greater profit for the employer by increasing the worker's efficiency.

Incentive may be set on a time allowance, a piece rate, or the workers may participate in the profits of the company.

Day Work System.

Ordinary day work pays no premium. It is simple to handle through the pay roll department and it is easily handled in figuring costs. It requires more supervision by the foreman, and there is no reason for the worker to put out extra effort since he does not share in the profits.

Time Allowance System.

Tasks are set up on a basis of time allowed to do the job or the number of pieces required per unit of time. This type requires a greater amount of work in the pay roll and cost department than is required for day work or for piece work. It requires more supervision than piece work. It does not ordinarily have the same inducement for high productivity as does piece work. The worker is not able to figure his earnings at the same time the job is run and he is not always sure of the amount of premium due him.

For management, the system has an advantage in that the company may figure on sharing the premium with the workers. Management may work this out for any percentage of the savings.

Piece Work System.

Rates are easy to figure in the pay roll and cost departments, since each piece is worth so much money. Piece work does not require as much supervision; each worker is his own boss and can figure his daily earnings. In most cases, the worker is paid the entire allowance; management's gain is the increase in the worker's productivity. Piece work requires more inspection for quality.

Many workers object to this system because they feel that they have to work at too high a rate of speed. If the worker feels that his rate will be cut if his earnings are high, he is likely to set a pace not in proportion to his capacity for fear of getting a rate cut. Piece work permits a wide variation in output of any worker or group of workers.

Participation in Profits System.

This is a premium paid on profits after closing the books for the year. The biggest object is that it takes too long to earn the reward or premium; it has been demonstrated that the quicker we pay the premium, the more effective it is with the workers.

Another objection is that even though the worker produces at a good rate of speed and should be entitled to a reward, other factors may prevent the company from making a profit even in a good business year.

A comparison of individual and group incentive plans emphasizes these facts:

The standards set for individual jobs require a more closely studied and planned installation. More careful time studies have to be made, including allowances to add to the time bases.

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Fewer time studies are necessary for group incentives, but larger allowances may have to be added to the base times.

As each worker in the group shares proportionately, however, any error in the allowance will not increase or decrease the earnings of the one worker to any great extent.

It is always necessary to have the next job ready for the individual incentive worker, while a group worker completing his part of the job will help someone else in the group.

The worker on individual incentive usually has to know more things, and do more things, than a group worker who may only drill screw holes and let another worker run the screws.

Individual incentive presents an opportunity for each worker to excel on his job and gives him a chance to earn a very high premium. The slow or inefficient worker is more quickly discovered.

In group bonus, each worker is a part of the whole, and is responsible to all the workers within his group for an honest effort to do his share of the job. Sometimes the fast worker helps "cover up" for the inefficient worker in the group. However, this is not always the case and the good workers make it very unpleasant for the slow man. They take on the responsibility of supervising the job and either bring the slow fellow up to speed or cause his transfer to another group.

There are usually skilled and unskilled workers in every group. Their hourly rates are different and any premium earned is pro-rated on the basis of their hourly rates if the incentive is figured on a time basis. If straight piece work is used the premium is pro-rated on an equal basis regardless of rates.

Workers Put in 9 Groups.

The Cavalier Corp. has a group incentive plan. With approximately 500 workers on the payroll, the natural division of the work permits the use of 9 groups having from 12 to 100 workers per group.

Group 1. Stampings. All work necessary from the shearing of the sheets through the forming of the parts. The equipment involves the use of 7 shears, 5 notching presses, 3 draw presses, 2 horning presses, 3 power brakes, 1 double crank multiple punch, and 1 circular shear.

Group 2. Welding. Arc and acetylene welding, brazing, spot, seam and gun welding. We have 7 spot welders, 2 seam welders, 2 gun welders, 3 arc welders, and 8 acetylene torches usually in use.

Group 3. Metal finishing and grinding. The work done in this group includes all grinding and metal finishing, loading the degreaser conveyor chain, and some of the transferring of parts between departments. There are 4 double spindle grinders, 4 electric driven disc sanders, and the necessary hand finishing tools.

Group 4. Drilling, tapping, beading, seaming, hand folders and hand brakes, and some solderers. In this group there are a lot of different jobs, and this is the group in which we do a lot of miscellaneous work, but the total time per unit for all work in this group is very small.

Group 5. Porcelain Enameling. All porcelain enameling operations are in one group. The premium is based on the total pieces inspected and accepted by the stock man.

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Group 6. Finishing Department. Cooking and heating appliances. This group includes all workers to unload the degreaser, load finishing conveyor, spray, sand, inspect, and unload chain.

Group 7. Finishing. Cooler Department. This group includes workers doing the same operations as listed under No. 6 and in addition they roll letters and stencil trade marks on the coolers.

Group 8. Assembly Department. Cooking and heating appliances. Two assembly lines are in use, one for ranges and one for heaters. The allowances for each assembly line, of course, are figured separately.

Group 9. Assembly Department. Coolers. All work is done in this department necessary for the completion of the coolers. It includes seaming, soldering, installing and insulating the liners, installation of the refrigerating unit, and packing.

Operation of the System.

From time studies we have developed charts for a great many standard operations and these charts are used when setting the allowances. In the finishing department, before we can make an allowance for a job, we must have specifications covering the finishing material, whether the process is to be a one-coat or two-coat job, the temperature at which the material should be fired, and length of time it must stay in the furnace. The size and shape of the piece determines the footage of chain required per unit. With these factors in mind, it is then very simple to set the time allowance on a job.

When we run into a new operation a temporary allowance is made for estimating purposes. It is time studied when the job is run and corrections are made in the allowed time before the premium is paid.

We build up the allowance on a time basis, then convert it to a money value. The group is told that allowances are set for a season (a year) and they are not to be changed under ordinary conditions. However, a marked change in general business conditions may require a revision of all allowances. We reserve the right to change an allowance if there is a change in methods or equipment, but we usually allow the worker to receive the benefit from the improvement for a season. Any changes or improvements originating with the worker belong to them. We try to encourage increased efficiency and make suggestions to the worker to help him boost his bonus.

Fair play is absolutely necessary.

All jobs completed by a group during a pay period are listed on bonus sheets and two copies are sent to the factory, one for the superintendent and one for the department. The sheets show the date, the name or number of the department, the order number, and the number of pieces completed on each order. On the right hand side of the sheet the labor allowed and the labor used on each order number are listed in parallel columns. Each column is totalled and the savings shown both in dollars and in percentage.

Each man working in the group earns a bonus equal to the percentage of savings multiplied by his day rate wages charged to the job. The higher the percentage of bonus, the more the worker earns per hour. The management also shares in this saving.

For example, assume the following to be true:

For the week ending February 8, Group 3 completes three jobs with a

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total allowance of \$80, and labor charged to the jobs is as follows: Man A, 40 hours at 45c, \$18; Man B, 24 hours at 75c, \$18; Man C, 40 hours at 60c, \$24. Totals: \$80 allowance, cost \$60; amount saved, \$20; percentage bonus earned, 25%.

Then each man has 25% added to his pay.

A draws \$18 plus 25%, or \$22.50.

B draws \$18 plus 25%, or \$22.50.

C draws \$24 plus 25%, or \$30.00.

Total earnings for the group, \$75.

The company saves \$5, which is the difference between the \$80 allowed and the \$75 paid out. This helps pay the cost of operation of the system.

A earns with premium 56 $\frac{1}{4}$ c per hour.

B earns with premium 93 $\frac{3}{4}$ c per hour.

C earns with premium 75c per hour.

The bonus for the foreman is based on the direct labor for all productive orders completed during a month, plus the departmental non-productive labor allowed in the budget over which the foreman exercises direct control.

The results for all departments are added together and not each department separately. We believe this stimulates co-operation among the foremen.

If the factory earns from 0 to 1 $\frac{3}{4}$ on the total estimated labor for the month, a bonus of 10% is paid each foreman on his month's salary. For each additional 1% earned we pay an additional 1%. For example, if the labor including bonus for the month is 2% less than the estimate, the bonus for the foreman will be 11%.

These plans admittedly are not "tops" from an engineering angle. There are many weak points, but we feel that the unit cost is much lower than would be true if only day work were used.

Chemistry's New Building Blocks

By R. S. JANE

Text of paper given before The Canadian Society of Cost Accountants and Industrial Engineers at The Engineers' Club on March 7th, 1941.

In recent years with the ever-increasing popularity of the modern automobile the petroleum companies have been faced with the problem of increasing the yield of gasoline from a given crude. By means of a great and costly chemical research programme the oil companies during recent years have increased the yield and quality of gasoline from crude to such an extent that to-day an abundance of high quality gasoline is available everywhere across this Continent.

In the cracking process, which is the most important method used for manufacturing gasoline from crude, vast quantities of gases are formed, the greater part of which have been used for fuel. These refinery gases, as they are called, are now recognized to be one of the cheapest sources of chemical raw material that we have on this Continent. The oil chemists, after studying the chemistry of these gases in connection with the production of gaso-

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line, have found that scores of industrial chemicals and other products can be built up from them. For this reason they have been called "Chemistry's New Building Blocks". The building up of new industrial products from these refinery gases has created a vast new chemical industry, particularly in the United States. In 1940 approximately 35,000,000 proof gallons of ethyl alcohol (that is, grain alcohol) was made from ethylene, one of the constituents of refinery gases. To obtain ethyl alcohol, ethylene gas is simply reacted with water in the presence of sulphuric acid.

Another important industrial chemical produced from refinery gases is acetone, a very important solvent used in large quantities in the manufacture of cellulose acetate silk (celanese). From acetone there is made large tonnages of acetic anhydride, which is one of the principal chemicals used in cellulose acetate manufacture. Millions of pounds of these important products are produced yearly in the United States in this way.

Recently Glycerine, normally made from animal fats, has been made from propylene, one of the constituents of refinery gases. While no commercial plant has yet been built, all the technical information necessary to build a large plant is in the possession of the Shell Development Company in California, where the original work on the process was carried out.

Another outstanding development is the production of synthetic resins from the same refinery gases. Several of the Vinyl group resins, such as Vinylite and Koroseal, are typical examples. Both of these products have found wide application in the electrical insulation and allied industries.

Probably the most outstanding development and the one that is foremost in the minds of us all on this Continent is the possibility of supplying all our rubber requirements from refinery gases as a raw material. The possibility of war with Japan and the cutting off of our supplies of natural rubber from the East Indies has brought synthetic rubber into our daily conversation. The research chemists of several of the large oil companies in the United States have now developed processes for producing a compound called Butadiene from petroleum, Butadiene being the basic substance from which the German synthetic rubber "Buna" is made. We are told that in the United States Butadiene can be produced in tremendous quantities at a reasonably low price and that, if necessary, with the combined efforts of the Oil, Rubber and Chemical Companies on this Continent, within less than two years we could be self-sufficient as far as rubber requirements are concerned. The amount required would be of the order of 600,000 tons per year, which might be increased to 900,000 tons under war conditions.

The foregoing products are only a few of the numerous substances that are now being produced on a rapidly growing commercial scale from refinery gases. Sufficient has been said, I think, to indicate the tremendous possibilities in this new source of chemical raw material. What the ultimate development will be no one can predict, but it is almost certain that most of us will live to enjoy the fruits of the chemical research now in progress in the laboratories on this Continent.

Unemployment Insurance and Its Implications

By DR. J. S. HODGSON

An Address Before the Montreal Chapter, Friday, March 21, 1941.

The subject upon which I have the pleasure to address you is one which may take some time, and in order to make it as clear as possible I propose to divide my remarks into four parts:

1. The background of the legislation in Canada and elsewhere in the world.
2. The characteristics of the new Unemployment Insurance Act and their social implications.
3. The reason why the Act was passed while Canada was at war.
4. The basic procedures which are presently proposed.

Background.

Unemployment Insurance is a subject which has been under discussion in Canada for upwards of twenty years. At the end of the first Great War, all the leading statesmen of this country were convinced of the need for such legislation. At the very time when progress was expected, however, the British scheme met with fundamental financial difficulties and it was therefore deemed expedient to delay the enactment of any legislation until the British scheme, the matrix of all Unemployment Insurance, had been stabilized.

In 1935, the Employment and Social Insurance Act was passed by the Federal Government of Canada. This Act was modelled after the British system. It was found, however, to be ultra vires of the Federal Government and was not put into effect. Negotiations were undertaken to clarify the constitutional position.

Meanwhile, studies were undertaken by officials of the Department of Labor with a view to making any necessary modifications in the legislation. In 1938, Mr. D. Christie Tait, of the International Labor Organization, was brought to Canada to give advice. Mr. Tait's report recommended a form of legislation which is essentially that adopted last year.

In the Spring of 1940, after long negotiations, all provinces of the Dominion finally agreed to delegate power to the Federal Government, so that a new statute might be enacted. The constitution of Canada, The British North American Act, was amended to make this possible and a new bill was introduced in July, 1940. The bill was considered in great detail in both the House of Commons and the Senate, and in special committees of both Houses. On August the 7th of last year, it received the Royal Assent.

Since that time, a nucleus of Government officials has been working on the details of organization. They are seeking to accomplish in a matter of months what took years in Great Britain.

It might be well at the outset to make clear what Unemployment Insurance really is. It is the opposite to the "dole". The dole consists in the payment of moneys to unemployed persons who are on the verge of destitution and who need relief. Unemployment Insurance benefits, on the other hand, are paid not because of need, but because a person has estab-

UNEMPLOYMENT INSURANCE AND ITS IMPLICATIONS

lished a right to them by virtue of contributions previously made.

In Canada, the contributions are made by the employee, the employer and the Federal Government. The scheme is therefore a co-operative measure of Social Security in which three parties combine to provide the funds required.

The original form of Unemployment Insurance legislation is the British Act which was introduced by Mr. Winston Churchill in the year 1909—32 years ago.

The British Act passed in 1911 was confined to only a few industries, but was extended after the last war, and several times since. The Canadian Unemployment Insurance Act spreads a cloak of protection over approximately the same groups that were protected in Britain after 25 years of experience in that country.

It was estimated by the Dominion Bureau of Statistics that there would be about 2,100,000 wage earners insured. If we include dependents, 4,660,000 persons will be protected against unemployment by this scheme. The fact that Canada is at war means that the number of wage-earners has increased. Therefore, there would probably be 2,500,000 insured persons, or, if we include wives and children, 5,000,000 persons protected altogether. Needless to say, the Unemployment Insurance Act is compulsory.

A number of employments are not insured, largely because of administrative difficulties. Agriculture, lumbering, transportation by air and water, private domestics and persons earning more than \$2,000 in a year are the chief exclusions. It seems logical to suppose, however, that investigation will be given to the possibility of extending the coverage of the Act still further in the future.

Characteristics.

There are certain characteristics of the Canadian Act which might be interesting.

The basis for contributions is different from that used in Great Britain and in the United States. In Great Britain, the so-called "flat rate" principle is adopted; that is to say, all adult male wage earners contribute at the same weekly rate and receive benefit at one rate. Lower rates are established for juveniles, young persons and women in Great Britain. In addition, the British scheme has what are known as dependents' benefits; that is to say, if a person has a wife, he is entitled to an increase in benefit, and for each child a further increase. This was the scheme which was adopted in Canada in 1935. The new scheme, however, replaces the flat rate and dependents' benefits by a so-called "graded rating".

The grading principle is not new. It has been in operation in South Africa, Norway and Italy for some time. The structure of the Canadian grading system is that contributions corresponding to a wage level. For example, persons earning between \$15 and \$20 will contribute 24c each week. Persons earning between \$20 and \$26 will pay 30c, and so on. The benefit paid is a direct multiple of the contribution made by an insured person. Thus the person who contributed 24c each week would be entitled to benefit which is 34 or 40 times 24c, depending on whether or not he has dependents. The person contributing 30c would receive in benefits 34 or 40 times 30c. In other words, persons earning \$16 in wages would be entitled to \$9.60 if they had one or more dependents, and \$8.16 if they are

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single. A man earning \$22 a week would receive, when unemployed, \$12 or \$10.20.

It can be seen that there is a fundamental difference in principle between the so-called flat rate and the grading principle. The flat rate pays benefit to compensate need arising from unemployment. The grading system seeks to insure a standard of living.

The great advantage of grading is the possibility of paying a more adequate benefit to an unemployed person. If a flat rate is used, it must be geared to the lowest wages paid anywhere in the country or else a person might be receiving more in benefits than he would receive in wages when working. In Canada, where wage levels between one province and another, and between city, town and country, are so widely different, a flat rate of benefit would necessarily be extremely low.

The graded system is also fairer than the flat rate to persons who, though having no dependents, might have fixed obligations commensurate with their normal standard of living.

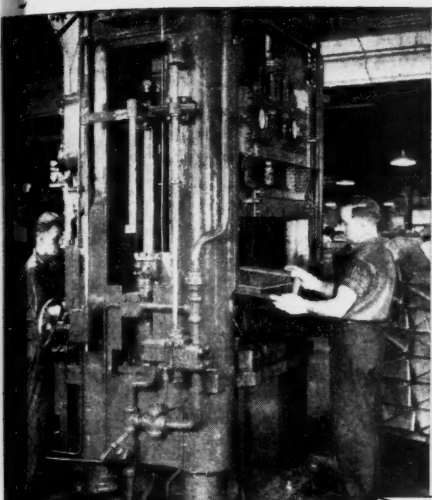
The graded system has a number of other advantages, foremost among which is its flexibility. Wages and cost of living are not "as the laws and the Medes and Persians, that changeth not". Where a flat rate of contributions and benefits is used, it is necessary to make frequent amendments to gear the unemployment insurance scheme to the cost of living. Anyone who has read the history of the British Unemployment Insurance scheme will be aware of the frequent amendments of this type which have been made there. The grading system in Canada takes care of such changes in the cost of living automatically. If a person's wages rise, he contributes in a higher class and receives a higher benefit; if the wage falls, benefit is reduced in proportion.

There is another important characteristic of the grading system which should be noted. It is **not regressive taxation**. The contribution levied upon the workman is related to his earnings, whereas under a flat rate system, the contribution is standardized at, for example, 25c or 30c, which may be a substantial amount for a person whose earnings are only \$6 or \$7 in a week.

In the United States, a percentage system of contributions is used. It was thought desirable, however, in Canada to use a system of grading in eight classes, not only on the grounds of simplicity in administration, but also because it is possible to pay a more adequate benefit to persons who normally receive low wages.

The new Canadian Act incorporates a second new principle different from those now in operation in the United States and Great Britain. This is the so-called "**ratio rule**" whereby the duration of benefit payments to an insured person is directly related to his employment history. Thus a person who has been fully employed will be entitled to a longer period of benefit than a casual laborer. In Great Britain and United States, a person who has qualified for benefit is entitled to a flat duration of, say, 13 weeks, regardless of his employment history. Under the Canadian Act, the number of weekly benefit payments which may be received is equal to the difference between:

- (a) $1/5$ of the number of weekly contributions made in the previous 5 years while in employment;



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- (b) $\frac{1}{3}$ of the number of weekly benefit payments received in the previous 3 years.

Perhaps an example would be useful. A man who had worked for 30 weeks during his first year of insured employment would be entitled to $\frac{1}{5}$ of 30 or 6 weeks of benefit. If he worked for 30 weeks, again in the next year the benefit would be $\frac{1}{5}$ of the 60 contributions made, less $\frac{1}{3}$ of the 6 benefits paid; in other words, $12 - 2 = 10$ weeks' benefit, and so on.

It can be seen that the ratio rule gives an advantage to the man who has a good employment record, and creates an incentive to him to keep his benefit rights intact during short periods of unemployment in order to provide for a "rainy day" that might follow. The ratio rule means also that there would be fewer claims from casual workers. In other words, the Unemployment Insurance Scheme does not subsidize underemployment in this respect. The rule is automatic in operation and the principle is easily justified. It allows a maximum of 52 weeks' benefit to a person with a good employment record.

A third feature of the Act is worthy of mention. Provision is made for daily, as well as weekly, contributions and benefits. This provision means that the Canadian Act will deal automatically with the problem of partial unemployment—a problem which has caused great difficulty in other countries.

Conditions and Disqualifications.

Benefit is paid under the Canadian Act only to persons who have fulfilled four statutory conditions. In the first place, an insured person must have made contributions while in insurable employment for not less than 180 days during the two years immediately preceding the claim for benefit.

2. He must prove that he was in fact unemployed on every day in respect of which he claims benefit. This is done by reporting periodically at the nearest employment office of the Commission.

3. He must prove that he is capable of work and available for work, but unable to find suitable employment.

4. He must not have refused a course of instruction which the Unemployment Insurance Commission may have instructed him to attend.

There are certain circumstances which may disqualify a person from benefit:

1. A man who is directly interested in, participating in, or financing a labour dispute which has caused a stoppage of work is not allowed to receive benefit for a "penalty period". In other words, where he is actually a striker, he is disqualified from benefit for a period not greater than six weeks.

2. A person who has refused an offer of suitable work—that is to say, work similar to his usual work at wages and under conditions substantially the same—is disqualified from benefit.

3. A man who voluntarily quits work without just cause, or who is discharged for misconduct is also disqualified.

4. A person under 16 years of age is not regarded as being properly in the employment market and therefore is not entitled to benefit.

5. An inmate of a public institution or a prison is disqualified.

6. Lastly, a person receiving inconsiderable wages—that is to say, less than 90c a day—is not entitled to benefit.

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In all cases, when a claim is made, a person must wait for nine days before being entitled to receive it. These nine days, called "waiting days", may be consecutive or spread over a period. The purpose of the waiting days is partly administrative and partly to save the fund from being depleted over a period when benefit is not of great importance (so that benefit can be paid for a longer period of unemployment).

War-Time Implications.

The fact that Canada is at war makes the Unemployment Insurance Scheme quite important. It is expected that about \$60,000,000.00 will be received annually from employers and employees. When I receive my puny pay-check, I proceed to a bank to deposit the money—assuming that I have not already used that money. Those funds placed in the bank will be entered in a book against my name although I gave no actual money to the bank and although the bank does not keep money assigned to me as an individual. In other words, the bank uses my salary for investment purposes and pays me interest in return. In the same way the money contributed to the Unemployment Insurance Fund can be invested in Government obligations, that is to say, in the war effort.

In addition, Unemployment Insurance, by levying a contribution on wages and on employers will tend to prevent private consuming power from interfering with the war effort. For example, the Government may have large orders for military motor cars. If I buy a motor car, I am using up a type of labour which is of great importance to the war effort, and therefore delaying the service which may be given to the Government and raising the cost of military motor cars.

The Unemployment Insurance Act provides for the establishment of a new employment service. A full-time office is to be opened in every town having over 10,000 residents and in a number of special cases. In these times of full employment, when skilled and semi-skilled labour is extremely scarce, a scientific placement service will be of the greatest value, since it will pick up all those available for work and send to employers those who are best qualified. This naturally means less friction in the labour market and more productive power. There is also a labour transference scheme under the Act whereby funds may be advanced to a man to pay his fares and all necessary expenditures so that he may reach a place where work has been found for him.

The new scheme will also bulk large in the post-war reconstruction period purchasing power. There is no doubt that the employment service will be important in finding work for demobilized soldiers and for those presently employed in the munitions industries. Sir Arthur Steele Maitland, Dr. MacNamara, former Minister of Labour; Mr. Lloyd George and Professor G. D. H. Cole are among those who have publicly expressed the opinion that Unemployment Insurance prevented the outbreak of a revolution in Great Britain after the first Great War.

Basic Procedures.

You may be interested in mechanics of the Unemployment Insurance plan. At the present time, it is possible only to outline the general plan. Contributions will be paid by stamps. These may be adhesive stamps or, in some cases, stamps in meter machines. The value of the stamp will include both the employer and employee contributions. There will there-

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fore be eight types of stamps corresponding to the eight grades of contributions provided for in the Act. These stamps will be affixed to an individual book for each employee each pay period. The insurance book of the insured person will be the record of his employment and all contributions made in respect of him.

Whenever a person is employed in insurable employment, his insurance book will be in the hands of the employer. When he is released from employment, his book will be returned to him so that he can take it to the local office to make his claim for benefit.

There are a great number of questions which I have not been able to touch upon. It is impossible to explain in a day, a week, or even a month, all the implications of an institution such as the one under the jurisdiction of the Unemployment Insurance Commission. I shall be pleased, however, to enlarge upon any point that interests anyone present and to answer any questions insofar as I am able.

Personal Notes

Congratulations to M. R. "Mac" Gillan, Chairman of the Hamilton Student Section, and R. "Dick" Nunn, Secretary of the Windsor Student Section. It's a girl in both cases.

Congratulations also to Milton Kranch, popular director of the Ottawa Chapter. It's another girl.

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The Use of Graphs in Controlling Production

By C. K. LOCKE

A Lecture to the Australian Institute of Cost Accountants, N.S.W. Division
(Reprinted from The Australian Accountant)

Several times lately I have heard the opinion expressed that the existing troublous conditions, with an unpredictable immediate future looming ahead, make this the wrong time to institute a program either of Production Control or of Budgetary Control. To me this opinion seems to be grounded on unsound premises and to indicate an entirely erroneous conception of the functions and purposes of such programs. Such an opinion I think can be tenable only if the success or failure of a method of production planning and control is deemed to depend upon the closeness or otherwise with which the results forecast in the plan approach those actually achieved.

I suggest that this success does not depend upon any such thing, and that it would be just as reasonable to say that a compass whose needle always points North is useless to a vessel sailing West or East or South or in any direction but North.

To have a previously determined program based on knowledge of capacity to produce and to market provides the compass needle. To measure current achievements and to measure available work, be it by months or weeks or days, enables us to trim our course just as the helmsman trims the course of his ship, and the degree of variation from the planned program which circumstances compel us to make does not invalidate the guidance given in the steps which it is necessary to take. In fact, the greater the variation the more need for guidance and, therefore, the greater need and usefulness of Production Planning and Control.

I will agree that a plan instituted in more normal times is likely to be more useful now than one just instituted, but mainly because those responsible for its working would have acquired more experience in its intricacies and uses and therefore be more expert in accurately interpreting its indications and in instituting the steps necessary to improve results.

The knowledge that nationally we would be more secure to-day if we had built up a defensive organization on a gigantic scale before the War or even immediately on its outbreak does not make any of us suggest that we should not now put forth every effort humanly possible. And the knowledge that planned production started, say, two years ago would be a great help to a business now, should not deter us from building up a method of Production Control just as soon as the preliminary data can be assembled.

This article deals with the subject of Planning and Controlling Volume of Production and explains some graphs which have been found useful for that purpose. Before detailing the points which these graphs are intended to emphasize, it will probably be advisable if I explain very briefly the activities and peculiarities of the industry the production of which they portray.

The products are all tailored articles of men's wear, that is, suits, overcoats, sports coats, trousers, etc., and although these garments pass from

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hand to hand in the course of manufacture (as many as 40 times in some cases) there are very few clearly defined steps or stages in production and practically every garment follows a different course.

Production records and charts are kept for five (5) groups or sections in these tailoring workrooms.

In production by processes, of the type for which process costing is used, it will, of course, be necessary to prepare charts for each process, and where the conditions permit of clearly defined production centres, charts for each production centre will be advisable.

The work entails manufacture of orders for large quantities of garments as well as a fairly large and inconveniently fluctuating volume of special orders for individual garments.

The variable nature of this volume of special work entails that the charts indicate as well as total production the production on quantity orders which I have termed production on planned work.

The unit of measurement used is the standard cost of the work performed excluding any material cost; that is to say, the total value added to the material by the processes and operations through which it is passed. Material is excluded because the business of manufacturing is to convert the raw material into the finished product—not to sell the material contained in the product—and its activities are much more accurately measured by the value added during the process of conversion.

The adoption of this conversion value also simplifies the preparation of data from which the charts are drawn.

For the sake of brevity and to avoid continually repeating myself, I shall refer hereafter to this added value as Standard Production Cost, so will you please remember that Standard Production Cost refers to the standard cost of the added value given to the raw material by the manufacturing processes.

It is possible and feasible, of course, to use the Standard Time for the performance of the work as the unit of measurement, but the use of Standard Cost enables the production record, and therefore the charts, to be tied up with the Cost Ledger, which enables one to prove the accuracy of the figures shown and instil confidence therein.

The charts are of the normal rectangular type, the weekly periods being shown as the abscissas and the Standard Cost in £ s., as the ordinates. The co-ordinates of the various curves are plotted weekly as being the shortest period for which the required data can be conveniently and expeditiously prepared.

The curves are treated cumulatively making a progressively rising curve, this is because the pictures required are of the conditions existing at any given date and of the trend of the curves rather than of the results achieved during any given week.

Should the chart indicate the necessity for further information before taking action, the results of any individual period are, of course, available from the tabulated information from which the charts are prepared.

In controlling the volume of production there are three main factors to be considered and related:

1. The predetermined program.
2. The results actually achieved.

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3. Variation of actual performance from that planned.

To present these factors graphically and clearly at short and definite intervals, and to indicate the cause of any variations and the amount and rate thereof, are the functions of graphs in Production Planning and Control.

In each of the graphs, planned results are indicated by broken lines, actual results by black lines and other factors by dot-dash lines.

In Chart No. 1, the broken line indicates the Standard Production Cost of the total forecasted production at weekly intervals.

The two main factors in determining this forecasted production are ability to produce (limited by capacity of the plant) and ability to sell (limited by the capacity of the market).

If a system of Standard Costs is in operation or if a unit system of labor control is used the data necessary to determine the ability to produce will be readily available or easily compiled.

The ability to sell must be determined by past experience over several years, the final result being influenced by current market conditions. The available data referring to sales will most likely be expressed in terms either of sales value or of quantities sold, and it will be necessary to convert this into terms of Standard Production Cost in the several sections, groups or processes for which graphs are being prepared.

This conversion will be rendered much easier if a system of Standard Costs is being operated.

In determining both the ability to sell and ability to produce, all the available data should be tabulated by months and weeks as well as by years, and the anticipated effect of any seasonal factors not operating during the period covered by the data as well as the method of calculating that effect should be clearly shown. This will not only assist in a more accurate forecast but will facilitate the preparation of forecasts for future periods.

In preparing the data used in determining the planned program it is always advisable to seek the co-operation of those in charge of the departments concerned with selling and production. And to endeavor to get them to accept the figures as their own forecast. The psychological effect of this attitude may save much friction when the time comes to institute action for control.

Department foremen and sales managers are very apt to disbelieve figures which do not reflect a favorable light on their efforts, but they will accept them much more readily if they have assisted in their preparation and will make much greater efforts to adhere to a program which they themselves have set than one which some "figure man" has set for them.

The black line in Chart No. 1 indicates the Standard Production Cost of total actual production, including special orders as well as planned work, plotted weekly as the period progresses. If a unit system of labor control or a system of Standard Costs is in use, it is necessary only to apply the Standard Cost per unit to the number of units produced as recorded by the unit system and used for the Standard Cost method to obtain the Standard Production Cost.

The dot-dash line indicates the Standard Production Cost of production that could have been achieved had every minute spent by each operative been fully productive at standard effectiveness.

The Standard Production Cost of this standard production by operatives

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employed is obtained by applying to the total hours spent in the department the Standard Production Cost of the standard performance per hour.

The purpose of this line is to indicate some of the causes of any variation in output; for example, should this line fall below the broken one, it would be obvious that insufficient operatives were being employed to produce the planned volume of production or insufficient machines being used if the machine is adopted as the unit of production. We shall designate this variation as being due to use of capacity.

Should the dot-dash line suddenly show a steeper trend, while at the same time the trend of the black line remains consistent, it would be a clear indication that more operatives were being employed or machines being used, but that reduced effectiveness was resulting in little, if any, increase in actual production. This variation we shall call variation due to effectiveness.

It should be remembered that the Standard Cost System takes care of the Cost, of any such reduced effectiveness, the graphs are concerned only with its effect on production.

I have mentioned that this tailoring section has to contend with a variable volume of special orders for individual garments.

In arriving at the production on quantity orders, or what we may term planned work, it is necessary to make provision for these special orders, but it must be conceded that any forecast of their volume for short periods is largely dependent on an element of luck for its accuracy, although over periods of one season, either summer or winter, the volume is reasonably consistent.

It has been found that these variations from the forecasted volume of specials do not involve any great difficulties provided they can be recorded and taken into account.

The volume of these special orders is shown at the bottom of the chart, the forecast of course being shown as a broken line and the actual production in black, and the divergence between the two curves will indicate variations in volume of standard production on planned work, due to unforeseen fluctuations in volume of special orders.

We may thus summarize the different causes of the variations in volume of production on planned work, Chart No. 1.

1. Variation due to use of Capacity. (Shown by the relative positions of broken and dot dash curves and by the trend of dot dash curve.)
2. Variation due to effectiveness either of operatives or machines. (Shown by the relative positions of black and dot dash curves.)
3. Variations due to unforeseen Fluctuations in volume of Special Orders. (Shown by the relative positions of the black and broken curves at the bottom of the chart.)

On Chart No. 2 is shown the production of Planned work only, excluding the Special Orders. As on the previous chart the planned program is shown as a broken line and actual performance in black. The relative position of the two lines indicates the total variation between performance and forecast which the previous chart divided into the three causes we have just examined.

This variation can be indicated in terms of time as well as in terms of Standard Cost. If the curve denoting actual performance be extended hori-

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zontally from its termination at any given date the point at which this extension intersects the curve showing planned performance will indicate on the bottom scale the number of weeks which actual is ahead of or behind the planned performance.

The dot dash lines show the amount of work available to the section measured by the Standard Production Cost of the orders actually received, and like all the other curves plotted weekly. The weekly terminations of this curve are extended horizontally until they reach the date for which delivery is required.

The point at which these extensions intersect the line of planned production indicates approximately the date on which orders should be completed assuming that the planned program is adhered to.

Should these extensions not intersect the curve of planned production as shown on Chart No. 3, the production must be accelerated ahead of the planned program if delivery dates are to be adhered to and a projection of these extensions horizontally will indicate the approximate date of completion.

When the indicated date of completion is later than the delivery date called for by the orders in hand, it is of course necessary to take action to ensure that production is stepped up beyond the current program.

This can be done either by increasing the number of operatives or machines engaged or possibly, if the hiatus between the dates is not serious, and the relation between costs and selling price will permit, by working overtime, or if the conditions of the industry allow by having portion of the work performed in other plants.

An indication of the amount of increase in production needed to complete the orders on hand by the required dates can be obtained by entering two projections from current terminal point of the curve of actual performance. One following the current trend and the other extending to the terminal point of the dot-dash curve.

The increase per period shown will be the measure of the required increase in production and this figure divided by the Standard Productive Cost of the Standard Performance per employee or per machine per week will indicate the additional number of operatives or machines needed to achieve the desired output in the desired time.

Plotting these projections and extensions at intervals on the actual graphs used results in their becoming somewhat overful with lines but it has been found that although to one not familiar with their use and interpretation they become a little confusing yet experience soon overcomes this and the required picture of actual conditions is very clearly portrayed even though the neatness of the graph be somewhat marred. And if some particular point requires emphasizing to the management it is comparatively simple to copy a graph leaving out the earlier extensions thereby isolating and clarifying the particular extension of the curves which indicates the point to which it is required to direct attention.

Chart No. 3, which shows how Chart No. 2 appeared at an earlier date indicates that at that date actual performance approximated to the predetermined program, the slight variation recorded being due to a smaller volume of Special Orders than had been foreseen, but it also shows that the planned program is insufficient to complete orders in the time required.

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The result of action that was taken to step up the production by increasing operatives is reflected in the increasing rate at which the actual curve draws away from the planned curve in Chart No. 2, and that it was achieved by employing additional operatives is indicated by the steeper trend of the dot dash curve.

Its effect on the date of completion is also shown on Chart No. 2. The dot-dash lines intersect the curve of actual performance at an earlier date than they do the curve of the planned program, showing an earlier delivery than would have been possible had the planned program not been accelerated.

If the Standard Production Cost of work available drops below a predetermined number of weeks in excess of the production line, then it is time to pep up the sales department. This is indicated by the measure of space between the curve of actual production and the dot-dash line extension at any given date.

It will be found useful to have a sheet of ordinary 10 to the inch graph paper scaled off on the same basis as the graph. This enables quick and accurate measurement of the space between any of the curves.

It will be noticed that much information and guidance can be obtained from the graph more speedily and easily than could be extracted from the figures from which the graph is prepared and indeed some of the indications which are most obvious on the graph can be deduced from the figures only by a good deal of calculation.

There are many factors in preparing the predetermined planned program, in preparing the data for the various curves, in converting that data into suitable terms for inclusion in the graph, in preparing the graph, in interpreting its indications, in obtaining information to confirm those interpretations, in instituting suitable action, and in observing and reporting on the results of that action.

All of these need careful study and attention if the charts are to achieve maximum usefulness, but it is not possible to deal exhaustively with these subjects in the space of this article.

All that has been attempted is to indicate some of the more obvious features and to suggest some of the uses which management can make of graphs in Production Control, and in doing this it is hoped that there has been found some agreement with the suggestion that even if current events cause performance to swing frighteningly away from the planned program that planned program still retains its value as a basis for the means of control.

No one who has had experience in the use of Standard Costs would ever doubt the value of this method as a means of controlling costs and through them profits, and it would seem a natural and inevitable step to use the data obtained and used in operating a Standard Cost System in the control of production.

It seems advisable to emphasize that the charts are not an end in themselves, neither is the planned program an end in itself, they are part of the means to an end and that end is more effective control of production.

The charts themselves will not control production but they will clearly indicate conditions, variations and causes, thus providing the means of intelligent control by management.

(Unfortunately, it was not possible to reproduce the charts mentioned.—Ed.)

Canadian Industrial Activity Rises

(From La Salle Extension University Bulletin)

The upward trend of industry and trade in Canada is even more marked than it is in the United States. The rate of industrial activity last month rose 6 per cent., and reached a point 39 per cent. above the 1937 level. It was 32 per cent. higher than a year ago. The percentage of factory capacity utilized rose from 96 to 100.

Advances were greatest in the heavy industries, with the iron and the steel trades 86 per cent. above the rate of operations last year. Some branches of the industry were producing two and one-half times as much as they were a year ago. The automotive trades are operating at a rate 56 per cent. above that of last year at this time.

The food industry has been increasing output gradually, and gains have been recorded in the production of lumber and furniture. Only slight rises are reported in the clothing and paper industries.

Output of metals, minerals, and chemicals has been steadily rising, but the gains in these lines have been somewhat smaller than in some of the major industries. The trend among them, however, is significantly and steadily upward.

Employment and pay rolls have been increasing along with the advance in production. The general pay roll index is at 153 per cent. of the 1937 level. The index of manufacturing wages, alone, is 157, while that for wholesale, retail, and service trades is 134. The increase over last year is about 40 per cent.

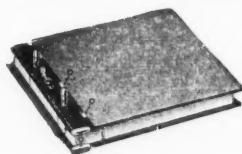
The general price level has remained relatively stable for many months. Business has been able to make adjustments involved in the shift to producing for war purposes without any major disturbances to prices. The average level is now about the same as it was a year ago.

Banking and financial conditions are also stable. Stock prices are about 15 per cent. lower than they were in the first part of last year. Bond prices have not fluctuated widely. Bank deposits have increased and are the largest in history.

The fairly well-balanced upward trend in industry and trade is likely to continue indefinitely, and the outlook is for further expansion in production.

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